A Perspective on DoD Manufacturing Policy and Technical Maturity Issues Challenging Affordability

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Challenge of Bridging TRL and MRL

• New Imperatives to Reduce Risk while improving Acquisition Affordability

Our Guidance

• Quadrennial Defense Review Executive Summary, February 2010
  - Further rebalance the capabilities of America's Armed Forces to prevail in today's wars, while building the capabilities needed to deal with future threats
  - Further reform the Department's institutions and processes to better support the current needs of the warfighter; buy weapons that are usable, affordable and truly needed; and ensure that taxpayer dollars are spent wisely and responsibly
  - Preserve and enhance the All-Volunteer Force
  - Improve how it matches requirements with mature technologies, maintains disciplined systems engineering approaches, institutionalizes rapid acquisition capabilities, and implements more comprehensive testing

• Quadrennial Defense Review Report Preface
  Secretary of Defense Robert M. Gates, February 2010
  - United States needs a broad portfolio of military capabilities with maximum versatility across the widest possible spectrum of conflict

DDR&E Imperatives

1. Accelerate delivery of technical capabilities to win the current fight.
2. Prepare for an uncertain future.
3. Reduce the cost, acquisition time and risk of our major defense acquisition programs.
4. Develop world class science, technology, engineering, and mathematics capabilities for the DoD and the Nation.
### DDR&E Key Transition / Fielding Programs

**‘Notional Alignment with Funding, TRLs, Acquisition Cycle, & MRLs’**

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<th>Funds</th>
<th>Research, Development, Test &amp; Evaluation</th>
<th>Procurement</th>
<th>O&amp;M</th>
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<td>Pre-Concept</td>
<td>MRL 4</td>
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<td>Mtrl. Solution Analysis</td>
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**Notional Matrix**

- **MRL 1** - Feasibility/Concepts
  - MRL 2 - Lab Environment
  - MRL 3 - Prototypes
  - MRL 4 - Components
  - MRL 5 - System Development
  - MRL 6 - Prototype System
  - MRL 7 - Systems in Production Environment
  - MRL 8 - Pilot Line - Low Rate Initial Production
  - MRL 9 - Begin Full Rate Production
  - MRL 10 - Lean Production Practices

**Key Programs**

- **Test Emerging Technologies for OCO**
- **Operational Experiments & Tech Integration for COCOMs**
- **Mature DoD Laboratory Technologies (Lab Push)**
- **COCOM / Joint/ Coalition Focused**
- **Mature Defense High-Impact Processes**
- **Test “Gap-Filling” Technologies for OCO**
- **Industry “On” Ramp - Test to Procure Tech Refresh**
- **Coalition Industry Mature Technology - Test to Procure**
- **Rapid Reaction Fund (RRF)**
- **Emerging Capabilities (EC)**
- **Technology Transition Initiative (TTI)**
- **Joint Capabilities Technology Demonstrations (JCTDs)**
- **Manufacturing Science & Technology (MS&T)**
- **Quick Reaction Funds (QRF)**
- **Defense Acquisition Challenge (DAC)**
- **Foreign Comparative Testing (FCT)**

**Key Terms**

- **TRL**: Technology Readiness Level
- **MRL**: Manufacturing Readiness Level
- **OCO**: Overseas Contingency Operations
Challenge of Bridging TRL and MRL

- Is accelerating TRL Development while compressing Manufacturing Readiness Level Timelines creating a wider gap for technology transition?

- Is there solid integration between Rapid Acquisition programs, initiatives and formal acquisition procedures?

- How could these be bridged?
Early Decisions Impact
Life Cycle Cost

System Life Cycle Acquisition Process

Development Planning

Combat Developer

PM Total Life Cycle System Manager

Materiel Developer

Materiel Command

Acquisition Framework

High Ability to Influence LCC (70-75% of Cost Decisions Made)

Less Ability to Influence LCC (85% of Cost Decisions Made)

(10%-15%)

Little Ability to Influence LCC (90-95% of Cost Decisions Made)

Minimum Ability to Influence LCC (95% of Cost Decisions Made)

(5%-10%)

28% Life Cycle Cost

72% Life Cycle Cost


Challenge of Bridging TRL and MRL

• How do you practically blend rapid acquisition goals with normal established acquisition policy and procedures?

Is a formal integration of TRL and MRL guidelines needed for DoD policy and procedures?
Expectations are being set earlier, but are the means to achieving them?

MDD is the lever to provide greater technical and engineering foundation for initiating an acquisition.
The Challenge of Technology Transition

“Perceptions” of the S&T Community
- S&T’s job is complete at the tech development stage
- Implementation of the technology is the customer’s (problem) responsibility
- The role of S&T is “tech push”— If it’s good technology — they will come!
- Development cycle for S&T is too long for most Acquisition and Warfighter customers
- Focus only on the technology and not on the business rationale for implementation

Key Impediments
- Budget: Lack of Transition Funds
- Transition Process Lacks Definition & Visibility
- Culture: Difference Goals & Timelines between S&T and Acquisition Managers
- Lack of Incentives (Performance shortfall is only driver)
Challenge: Bridging TRL and MRL

• New Imperatives to Reduce Risk while improving Acquisition Affordability
  – Accelerate TRL Development while Compress Manufacturing Timelines
  – Reduce Overall Risks to transitions
  – Normalize Rapid Acquisition
Long-term Implications

• Are decreasing budget coupled with pressure to preserve industry margins driving need for a different business model for technology investment?
  – Where are the incentives?
  – Is it better to have fewer programs with less risk?

• Are we running the risk of depleting investment in revolutionary and disruptive technologies?

• Does technology that has been field tested or demonstrated need to go completely through the acquisition process to be normalized or can it be fast tracked?
Summary

• Does your organization addressed how to bridge TRL and MRL processes?

• Do you map your IRAD to TRL or MRL metrics?

• Is the new affordability or value chain assessment formulas part of your review process?